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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/698,824	10/26/2000	Omprakash S. Sarmaru	VELCP003	7360
28436	7590	12/18/2003	EXAMINER	
IP CREATORS P. O. BOX 2789 CUPERTINO, CA 95015			DO, CHAT C	
			ART UNIT	PAPER NUMBER
			2124	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/698,824

Applicant(s)

SARMARU ET AL.

Examiner

Chat C. Do

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. This communication is responsive to Amendment A, filed 11/7/2003.
2. Claims 1-10 and 12-19 are pending in this application. Claims 1, 7, 12, and 17 are independent claims. In Amendment A, claims 1-10 and 12-19 are amended and claims 11 and 20-21 are cancelled. This office action is made final.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show certain key features as described in the specification. For example, the drawings fail to show “two dimensional sample arrays each having dimensions corresponding with communication parameters of the associated one of the at least two communication channels” in claim 1 and “the number of tones exhibited by a first of the at least two communication channels differs from the number of tones exhibited by a second of the at least two communication channels” in claim 2.

Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

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pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-10 and 12-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not clearly and adequately address certain limitations cited in the claims. In particular, the specification does not fully address the two dimensional sample arrays each having dimensions corresponding with communication parameters of the associated one of the at least two communication channels, device packets encapsulating each sample array and each device packet identifying both the corresponding one of the at least two communication channels together, the number of tones exhibited by a first of the at least two communication channels differs from the number of tones exhibited by a second of the at least two communication channels, at least one variable order radix sub-module responsive to the input of each sample array to vary an order of the radix based on the dimensions of the sample array, and logic for reducing the dimensions of sample arrays which exhibit hermetian symmetry by excluding any mirror reversed conjugates there form.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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7. Claims 1-10 and 12-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, the limitation "the associated one of the at least two communication channel" lacks an antecedence basis. For examination purposes, the examiner considers this limitation as "an associated one of the at least two communication channel". It is indefinite by the limitations "a pipelined succession of two dimensional sample arrays each having dimensions corresponding with communication parameters" in lines 5-7 and the limitation "to effect" in line 9. In addition, the limitations in part b "at least one row and column...the dimensions thereof" is unclear. For examination purposes, the examiner considers the limitations in part b as a transform circuit which dynamically is configured to apply 2-D transform on the input data from the input sample delivery circuit.

Re claim 3, it is mis-descriptive by the limitation "each device packet identifying both the corresponding one of the at least two communication channels" in lines 5-8. For examination purposes, the examiner disregards this limitation. In addition, the limitations "the processing of the associated sample array" and "the channel identification" lack antecedence basis. For examination purposes, the examiner considers these limitation as "a processing of the associated sample array" and "a channel identification".

Re claim 5, it is mis-descriptive by the limitation "the sliced radix module generating $1/R$ of the Fourier Transform" in lines 11-12. For examination purposes, the examiner disregards this limitation.

Re claim 12, the limitation "the delivering act" lacks an antecedence basis. For examination purposes, the examiner considers this limitation "a delivering act".

In addition, claims 12, 15, and 18 have the same problem as cited in claims 1, 3, and 5 respectively. Thus, claims 2, 4, 6-10, 13-14, 16-17, and 19 are also rejected for being depend on the rejected base claims above.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 3-4, 12, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Timm et al. (U.S. 6,055,268).

Re claim 1, Timm et al. disclose a FT processor for processing at least two communication channels (col. 5 lines 50-52; col. 5 lines 58-62; and col. 6 lines 44-46), and the FT processor comprising: an input sample deliver circuit (100-110 in Figure 1a as the interface from local modem to post office modem) configured to deliver the at least two communication channels as a pipelined succession of two dimensional sample arrays each having dimensions corresponding with communications parameters of the associated one (DMT in col. 3 lines 19-20) of the at least two communication channels; and at least one row and column transform circuit coupled to the input sample deliver

circuit to effect a pipelined 2-dimensional FT of each successive sample array there from and a length of the pipelined 2-dimensional FT dynamically reconfigured for each successive sample array to correspond with the dimensions thereof (FFT processes in col. 3 lines 12-18 and col. 6 lines 11-18).

Re claim 3, Timm et al. disclose device packets encapsulating each sample array (modulate/demodulate sample packet in/out of the local modem) and each device packet identifying both the corresponding one of the at least two communication channels together with any processing instructions therefore; and components responsive to each device packet to vary the processing of the associated sample array based on the channel identification and processing instructions in each device packet.

Re claim 4, Timm et al. disclose the communication parameters include a number of tones of a corresponding multi-tone communication protocol and wherein further the number of tones exhibited by a first of the at least two communication channels differs from the number of tones exhibited by a second of the at least two compunction channels (col. 2 lines 66-67 and col. 3 lines 1-4).

Re claim 12, it has same limitation cited in claim 1. Thus, claim 12 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 15, it has same limitation cited in claim 3. Thus, claim 15 is also rejected under the same rationale in the rejection of rejected claim 3.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 2 and 13-14 are rejected under 35 U.S.C. 103(a) as being obvious over Timm et al. (U.S. 6,055,268), as applied to claims above, in view of Ali ("Decimation-in-Time-Frequency FFT Algorithm").

Re claim 2, Timm et al. do not disclose the input sample delivery circuit further delivers sample sets of both frequency domain sample arrays together with time domain sample arrays and the at least one row and column transform circuit further dynamically re-configures the pipelined 2-dimensional FT between a frequency-to-time domain transform and a time-to-frequency domain transform depending on the domain of each successive sample array delivered. However, 2-D FFT/IFFT is well known in the art as seen in Ali's invention. Ali discloses in Figure 1 the 2-D DITF dynamically re-configures the pipelined 2-dimensional FT between a frequency-to-time domain transform (DIT) and a time-to-frequency domain transform (DIF) depending on the domain of each successive sample array delivered. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a detail 2-D FFT that is dynamically re-configured the pipelined 2-dimensional FT between a frequency-to-time domain transform and a time-to-frequency domain transform depending on the domain of each successive sample array delivered as seen in

Ali's invention into Timm et al.'s invention because it would enable to increase the system performance by reducing the order of the input samples.

Re claim 13, it has the same limitation cited in claim 2. Thus, claim 13 is also rejected under the same rationale in the rejection of rejected claim 2.

Re claim 14, it has the same limitation cited in claim 4. Thus, claim 14 is also rejected under the same rationale in the rejection of rejected claim 4.

12. Claims 5-6, 9-10, and 18-19 are rejected under 35 U.S.C. 103(a) as being obvious over Timm et al. (U.S. 6,055,268), as applied to claims above, in view of Gossett et al. (U.S. 6,230,177).

Re claims 5-6, Timm et al. do not disclose a sliced radix module of order "R" with R parallel input coupled to the input sample deliver circuit and the sliced radix module generating $1/R$ of FT of each row of each two dimensional sample array one each of R passes through the rows and each of the $1/R$ FT selected to provide a solution of coefficients required to process successive selected ones of the columns of each two dimensional sample arrays; a row module coupled to the sliced radix module to complete each row transform from the sliced radix module; and a column module coupled to the row module to complete the FT of each successive selected one of the columns of each two dimensional sample array during each of the R passes of the sliced radix modules, thereby improving throughput by overlapping row and column processing of each two dimensional sample array, and at least one variable order radix sub-module responsive to the input of each sample array to vary an order of the radix based on the dimensions of

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the sample array. However, Gossett et al. discloses in Figures 1, 4, and 12 a 2-dimension FFT wherein at least one row and column circuit (Figure 4) with an input (left input data to 401) and an output (right output data (404), and the row and column circuit performing (col. 2 lines 60-65) a row and column transform on complex valued samples at the input to produce at the output coefficients corresponding with an other of the time domain ($f(n)$) and the frequency domain ($F(k)$); and at least one sliced radix circuit (Figure 12) of order "R" with R parallel inputs ($R = 4$) and an output coupled to the input of at least one row and column circuit (output of Figure 12), and at least one sliced radix circuit transforming $1/R$ input samples ($f(n)$, $f(M+n)$, $f(2M+n)$, and $f(3M+n)$) from the sample set ($f(n)$) into a selected one among the R possible complex outputs (Complex multiply and col. 5 lines 39-46) and at least one variable order radix sub-module responsive to the input of each sample array to vary an order of the radix based on the dimensions of the sample array (Figure 2). Therefore, it would have been obvious for a person having ordinary skill in the art at the time the invention is made to add a 2-dimension FFT with detail structure, specially the sliced radix circuit, as described by Gossett et al.'s invention into Timm et al.'s invention because it is a key operation in many application domain including DSP for improving the system performance in real-time (col. 1 lines 57-64 in Gossett et al.'s invention).

Re claims 9-10, they have the same limitations cited in claims 5-6. Thus, claims 9-10 are also rejected under the same rationale in the rejection of rejected claims 5-6.

Re claims 18-19, they have the same limitations cited in claims 5-6. Thus, claims 18-19 are also rejected under the same rationale in the rejection of rejected claims 5-6.

Response to Amendment

13. The amendment filed 11/7/2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

There are certain amended limitations in Amendment A that cannot be found in the disclosure of the invention. For example, the limitations "two dimensional sample ... the associated" in line 5-7 in claim 1, the limitations in claim 3, the limitations in claim 4, the limitation "the sliced radix module generating 1/R of the Fourier transform" in claim 5, and limitations in claims 12-19.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

14. Applicant's arguments with respect to claims 1-10 and 12-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Chat C. Do
Examiner
Art Unit 2124

December 2, 2003


KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100